

WHAT IS CLAIMED IS:

1. A method for manufacturing a transistor, comprising:
providing a transistor assembly including a silicon based semiconductor layer
with a first surface, a dielectric layer disposed on at least part of the first surface, and
5 a gate electrode disposed on the dielectric layer, the assembly further including an
insulation layer adjacent at least part of the gate electrode and a nitride spacer layer
adjacent at least part of the insulation layer;
depositing, on a portion of the first surface, a material that will react with the
semiconductor layer to form silicide;
10 removing the unreacted material;
etching the nitride spacer layer;
depositing a pre-metal spacer layer adjacent at least part of the nitride spacer
layer and at least part of the silicided portion of the first surface;
etch removing a portion of the pre-metal spacer layer above the silicided
15 portion of the first surface to expose at least part of the silicided portion of the first
surface; and
forming a contact with the exposed part of the silicided portion of the first
surface where the pre-metal spacer layer was removed.
- 20 2. The method of Claim 1, wherein etching the nitride spacer layer
comprises reducing the width of the nitride spacer layer approximately thirty
nanometers.
3. The method of Claim 1, wherein etching the nitride spacer layer
25 comprises placing the transistor assembly in an etchant.
4. The method of Claim 3, wherein the etchant comprises phosphoric
acid.
- 30 5. The method of Claim 4, wherein the temperature of the etchant
comprises approximately one-hundred and sixty degrees Celsius.

6. The method of Claim 4, wherein etching the nitride spacer layer comprises placing the transistor assembly in the etchant between approximately two to eight minutes.

7. The method of Claim 1, further comprising:
rinsing the transistor assembly to remove the etchant used to etch the nitride spacer layer; and
drying the transistor assembly.

8. The method of Claim 1, wherein an edge of the contact is formed between approximately forty to one-hundred and fifty nanometers from an edge of the gate electrode.

9. The method of Claim 1, further comprising applying a dopant to a portion of the first surface to form a source region.

10. The method of Claim 9, wherein applying a dopant comprises diffusing arsenic into the portion of the first surface.

11. The method of Claim 1, wherein the material used to form the silicide comprises CoSi_2 .

12. The method of Claim 1, further comprising:

removing a portion of the nitride spacer layer to expose part of a surface of the insulation layer; and

removing the portion of the insulation layer below the exposed surface of the
5 insulation layer to expose part of the first surface of the semiconductor layer.

13. The method of Claim 1, further comprising:

depositing a second pre-metal spacer layer adjacent the first pre-metal spacer layer; and

10 etching a portion of the second pre-metal spacer layer above at least part of the silicided portion of the first surface to expose a part of a surface of the first pre-metal spacer layer.

14. The method of Claim 1, wherein depositing a material that will react
15 with the semiconductor layer to form silicide comprises depositing the material on an exposed surface of the gate electrode to form a silicided portion of the gate electrode.

15. A transistor comprising:

a silicon based semiconductor layer having a first surface, at least a portion of the semiconductor layer adjacent the first surface having been silicided;

a dielectric layer disposed on at least part of the first surface;

5 a gate electrode disposed on the dielectric layer;

an insulation layer adjacent at least part of the gate electrode; and

a nitride spacer layer adjacent at least part of the insulation layer;

10 wherein the distance from an edge of the gate electrode to the beginning of the silicided portion of the semiconductor layer is greater than the distance from the edge of the gate electrode to the edge of the nitride spacer layer closest the silicided portion.

16. The transistor of Claim 15, wherein the distance between the edge of the nitride spacer layer closest the silicided portion of the semiconductor layer and the beginning of the silicided portion comprises approximately thirty nanometers.

17. The transistor of Claim 15, wherein the distance between the edge of the nitride spacer layer closest the silicided portion of the semiconductor layer and the beginning of the silicided portion is formed by etching the nitride spacer layer after forming the silicided portion.

18. The transistor of Claim 17, wherein the etchant comprises phosphoric acid at a temperature of approximately one-hundred and sixty degrees Celsius.

19. The transistor of Claim 15, wherein the material used to form the silicide comprises CoSi_2 .

20. The transistor of Claim 15, wherein the dielectric layer comprises nitrided oxide.

21. The transistor of Claim 15, wherein the gate electrode comprises polycrystalline silicon.

22. The transistor of Claim 15, wherein the silicided portion of the
5 semiconductor layer has also been doped.

23. The transistor of Claim 15, wherein the distance from the edge of the gate electrode to the beginning of the silicided portion of the semiconductor layer is between approximately fifty and one-hundred and sixty nanometers.

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24. The transistor of Claim 15, wherein a portion of the gate electrode has been silicided.

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25. A transistor comprising:

a silicon based semiconductor layer having a first surface, at least a portion of the semiconductor layer adjacent the first surface having been doped and silicided;

5 a dielectric layer comprising nitrided oxide disposed on at least part of the first surface;

a gate electrode comprising polycrystalline silicon disposed on the dielectric layer, a portion of the gate electrode having been silicided;

an insulation layer comprising oxide adjacent at least part of the gate electrode; and

10 a spacer layer comprising nitride adjacent at least part of the insulation layer; wherein the distance between the edge of the spacer layer closest the silicided portion of the semiconductor layer and the beginning of the silicided portion of the semiconductor layer is more than twenty nanometers.